



Contribution ID: 119

Type: Poster

“Ab initio” development of a gaseous Compton Camera

Tuesday, 13 October 2015 16:20 (0 minutes)

Compton Cameras are being pointed as the instrument for far X and gamma-ray detection where the traditional Anger Cameras are inefficient. Moreover, these devices avoid the use of a heavy mechanical collimator responsible for a huge decrease of the photons that reach the Anger Camera crystal [1], [2].

Traditionally a Compton Camera is composed of solid state detectors (Si detector + Ge or NaI detector)[3]. Our proposal is to use a single High Pressure Scintillation Counter for the Compton and scattered photon interactions, based on Bolozdynya setup [4], by changing the high cost and low position resolution PMT array by a low cost gaseous photomultiplier with energy resolution and position discrimination capability: THCOBRA [5].

In this work we present the initial characterization of the high pressure gas scintillation proportional counter (HpGSPC) for pure Xenon pressures ranging from 1- to 5 atm. The optical gain and energy resolution as function of the drift and scintillation fields were studied by using a PMT achieving energy resolutions below 4% for 59.6 keV photons.

Calculation of the number of primary electrons and intrinsic position resolution will be presented as function of the gas pressure.

A detailed discussion of the experimental measurements and a comparison with simulation results is performed.

Results and details on the coupling of a gaseous photomultiplier based on a THCOBRA and operating in Ne/CH₄ will be presented.

[1] N. A. Pavel, Nucl. Inst. Meth. A, 478, 1–12, 2002

[2] A. Del Guerra et al., Nucl. Inst. Meth. A, 583, 119–124, 2007.

[3] W. G. Phillips, Nucl. Inst. Meth. B, 99,674–677, 1995.

[4] A. Bolozdynya et al., Nucl. Inst. Meth. A, 385, 225–238, 1997.

[5] C. D. R. Azevedo et al., Nucl. Inst. Meth. A, 732, 3–6, 2013. Assoc. Equip., vol. 732, pp. 3–6, 2013.

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Session Classification: Poster session & coffee break

Track Classification: Applications